

excerpt from **Maria Mitchell**
by Ellen Bailey

A Nantucket Childhood

Maria (pronounced Ma-RYE-ah) Mitchell was not only the first woman astronomer in the United States, but also the preeminent woman scientist of the nineteenth century. In addition to her discovery of the comet that would be named after her, she also taught at Vassar College. She spent a good part of her life training women astronomers and encouraging women to enter scientific professions.

Mitchell was born August 1, 1818, on Nantucket Island, Massachusetts, the third of the ten children of William and Lydia Coleman Mitchell. Her mother was a librarian and her father was a schoolteacher, banker and an amateur astronomer.

Mitchell began school at the age of four, which was not unusual at that time. Learning was by rote memorization, and the children spent six hours a day at school. Windows were often painted over so the children would not be distracted from their studies. In this atmosphere, Mitchell was considered an indifferent student.

After a few years, she began attending her father's school. He encouraged his students in various ways of learning, and taught them always to be observant and questioning, and often took them on field trips.

Mitchell was a visual learner, and under her father's tutelage, she made rapid progress in her studies. Another unofficial teacher was her cousin Phoebe Folger, a mathematical genius who taught navigation to her husband, who became a ship's captain as a result.

Nantucket was the world capital of the whaling industry, and it was natural that these seafaring people would be drawn to astronomy. From her earliest days, Mitchell was fascinated with the stars. This interest particularly pleased her father, who spent most of his free time gazing through his telescope. Whenever a whaling ship returned to the island, its chronometer¹ was always taken to Mitchell's father to be adjusted.

By age twelve, Mitchell was assisting in this work, which required stellar observations and a knowledge of the sextant. It was during this time that she and her father observed a total eclipse, an event that left a strong impression on her. For the rest of her life, she used her father's telescope to sweep the sky.

Eventually, her father gave up teaching for a position as a banker. Mitchell was then taught by her father's friend Cyrus Peirce, who would later become principal of the first "normal school," or teachers' school, in the United States.

Impressed by Mitchell's ability in mathematics, Peirce took particular interest in his pupil, even though mathematical instruction was unheard of for young women. Under Peirce's guidance,

¹chronometer—a device for measuring longitude at sea

Mitchell studied conic sections and navigation. She also learned to construct astronomical tables.

The Comet

At the age of sixteen, Mitchell's formal education was finished, since women were not allowed to attend college at the time. She was forced to learn on her own, through books and astronomical observations.

At first she worked for Peirce as an assistant teacher, but she soon decided to open her own school for girls. Mitchell operated her school in an innovative manner. Hours were varied: sometimes the pupils would meet at dawn to observe bird behavior, and at other times, they would gather at night to observe the stars. She also admitted Portuguese and African American girls to her school, an especially unusual practice in the nineteenth century.

After a year, Mitchell was hired to run the library on Nantucket. Since the library was open only part-time, Mitchell had plenty of time to pursue her own studies. These studies included continuing observations of the night sky with her father. He had mounted his telescope on the roof of the bank where he worked, and Mitchell swept the skies with it nightly. She made her notations in pencil, by the light of a whale-oil lamp.

On October 1, 1847, Mitchell observed a comet she had never seen before, five degrees above the North Star. Her father immediately informed his friend, William C. Bond, the director of the observatory at Harvard University, of his daughter's discovery. Suddenly, Mitchell, at the age of twenty-nine, was famous. Her discovery was named Miss Mitchell's Comet and is sometimes called the Nantucket Comet. People were particularly astounded by the news of her discovery, because it was almost impossible for a woman to receive an education in the sciences.

In 1832, King Frederick VI of Denmark had established a gold medal in honor of Danish astronomer Tycho Brahe (1546-1601) to be given to any person who found a comet with a telescope. Mitchell's father, assuming that others had seen the comet before his daughter, did not notify the Danish astronomical journal, as required. However, Mitchell's observation was proven to be the first. Her eligibility for the prize was established by her father's letter to Bond. The prize was awarded by King Frederick VII, successor to the medal's founder.

Mitchell was hired as a field researcher and "computer" for the U.S. Nautical Almanac Office. In this capacity, she calculated the position of Venus for the "American Ephemeris and Nautical Almanac." She would continue this work for twenty years.

A year after the discovery of her comet, Mitchell was elected to the American Academy of Arts and Sciences, the first woman to receive this honor. The Smithsonian Institution in Washington, D.C., awarded her a \$100 prize. She began traveling to attend scientific conventions, and she earned money giving lectures and writing articles for professional publications.

Vassar Professor

In 1857, Mitchell traveled to Europe, where she visited numerous observatories and met leading scientists, such as Cambridge University Professor George Stokes, England's leading mathematician. On her return to the United States, she received a telescope purchased by American women interested in science.

In 1861, Matthew Vassar (1792–1868) founded Vassar College for women in Poughkeepsie, New York. His purpose was to provide women with an education equal to that given to men in the country's best schools. He tried to hire the best women professors he could find.

When Vassar created an astronomy department, it was obvious that Mitchell was the best person to head the department. In 1865, Mitchell accepted the appointment as professor of astronomy and director of the observatory.

She moved into quarters in the observatory. Mitchell spent the rest of her working life at Vassar, and became a strong proponent of science education for women. She taught her students by including them in her astronomical work. Though this was considered radical, her students ranked at the top of Vassar's scholars.

When Mitchell discovered that women professors at Vassar were paid less than the men, she and Dr. Alida Avery, the college physician and professor of physiology, threatened to resign. The women's salaries were raised, though they still did not equal those of the men.

Mitchell was a member and president of the American Association for the Advancement of Women. Through this organization, she promoted the idea of women in science and medicine. She was also a member of the American Philosophical Society, an honorary member of the Women's Anthropological Society, and vice president for the Social Science Association. She was also the only woman elected unanimously to the American Association for the Advancement of Science.

Mitchell tried to retire in 1889, when she was seventy, due to her failing health. The college trustees, however, granted her an indefinite leave of absence instead. She died in Lynn, Massachusetts, on June 28, 1889.

1. What is the topic of the section of the passage titled "A Nantucket Childhood"?

- A. Mitchell's early relationships with her family
- B. Mitchell's desire to follow in her father's footsteps
- C. Mitchell's desire to excel in mathematics and science
- D. Mitchell's family background and early education

2. What is the meaning of the word proponent as it is used in the passage?

- A. supporter B. member C. distributor D. professor

3. According to the passage, why does Mitchell deserve the gold medal in honor of Tycho Brahe?

- A. for her scholastic achievements
- B. for her discovery of a previously unknown comet
- C. for her work with the American Association for the Advancement of Women
- D. for her election to the American Academy of Arts and Sciences

4. Which sentence from the passage is a fact?

- A. "... it was natural that these seafaring people would be drawn to astronomy."
- B. "Mitchell operated her school in an innovative manner."
- C. "After a year, Mitchell was hired to run the library on Nantucket."
- D. "... it was obvious that Mitchell was the best person to head the department."

5. Which statement from the passage best supports the author's purpose in the section titled "Vassar Professor"?

- A. "On her return to the United States, she received a telescope purchased by American women interested in science."
- B. "In 1861, Matthew Vassar (1792–1868) founded Vassar College ..."
- C. "Mitchell spent the rest of her working life at Vassar ..."
- D. "Mitchell was a member and president of the American Association for the Advancement of Women."

6. What sentence from the passage best supports the generalization that Maria Mitchell was a valued member of the Vassar faculty?

- A. "In 1857, Mitchell traveled to Europe, where she visited numerous observatories and met leading scientists ..."
- B. "She taught her students by including them in her astronomical work."
- C. "Through this organization, she promoted the idea of women in science and medicine."
- D. "The college trustees, however, granted her an indefinite leave of absence Instead."

7. What is the author's purpose in writing the passage?

- A. to inform the reader about one woman's life and accomplishments as a scientist
- B. to explain to the reader the difficulties faced by women scientists in the past
- C. to persuade the reader to study math and astronomy in school
- D. to describe to the reader the place where one scientist worked

8. How does the style of the passage affect the tone?

- A. The use of humorous language creates an amused tone.
- B. The use of derogatory language creates a disrespectful tone.
- C. The use of positive language creates an admiring tone.
- D. The use of objective language creates a speculative tone.

9. What is the effect of the subheadings in the passage?

- A. They compare Mitchell's life to the lives of others.
- B. They indicate eras in Mitchell's life.
- C. They emphasize Mitchell's challenges.
- D. They identify Mitchell's accomplishments.